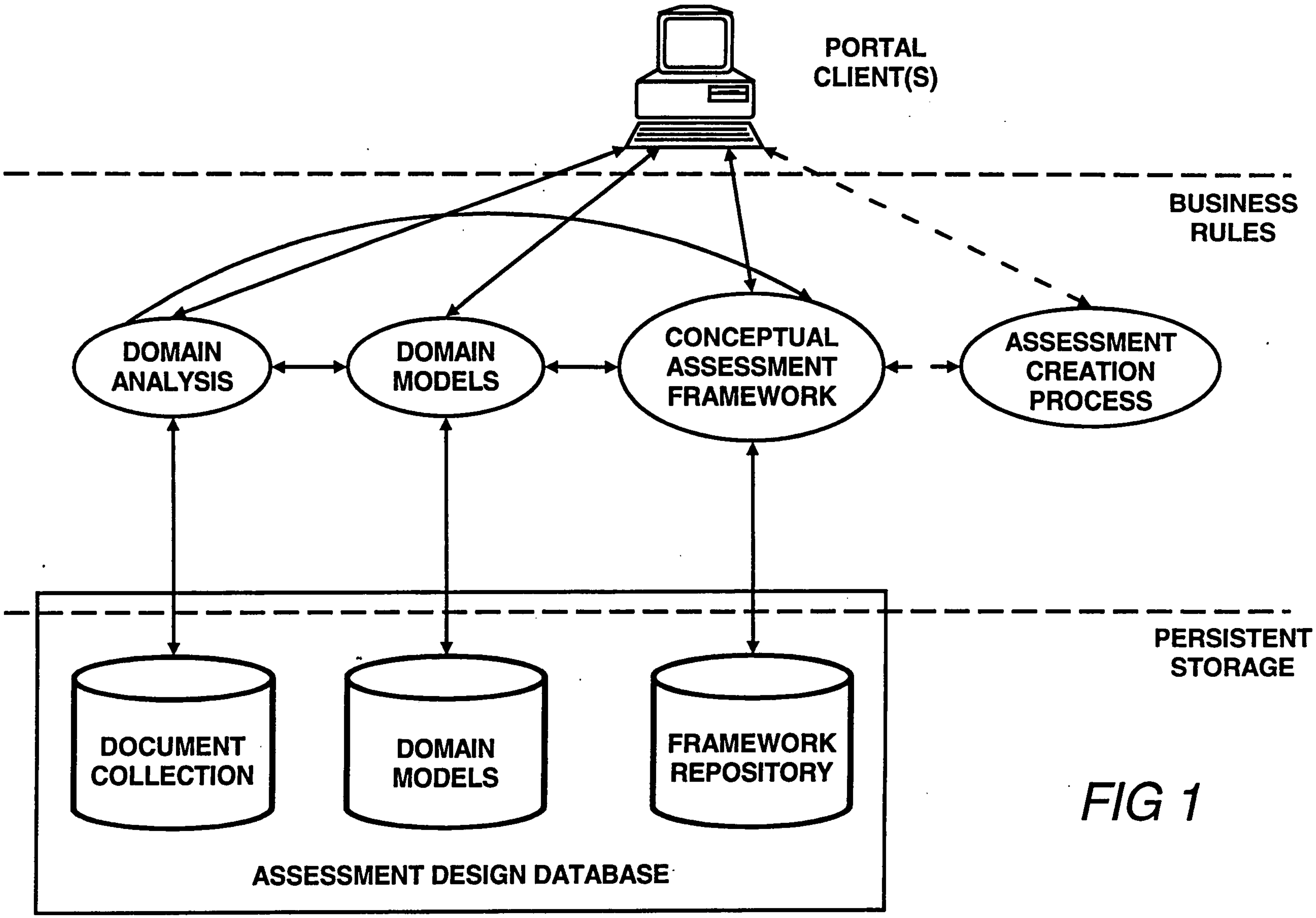

PORTAL
CLIENT(S)
BUSINESS
RULES
DOMAIN
ANALYSIS
DOMAIN
MODELS
CONCEPTUAL
ASSESSMENT
FRAMEWORK
ASSESSMENT
CREATION
PROCESS
PERSISTENT
STORAGE
DOCUMENT
COLLECTION
DOMAIN
MODELS
FRAMEWORK
REPOSITORY
ASSESSMENT DESIGN DATABASE

FIG 1

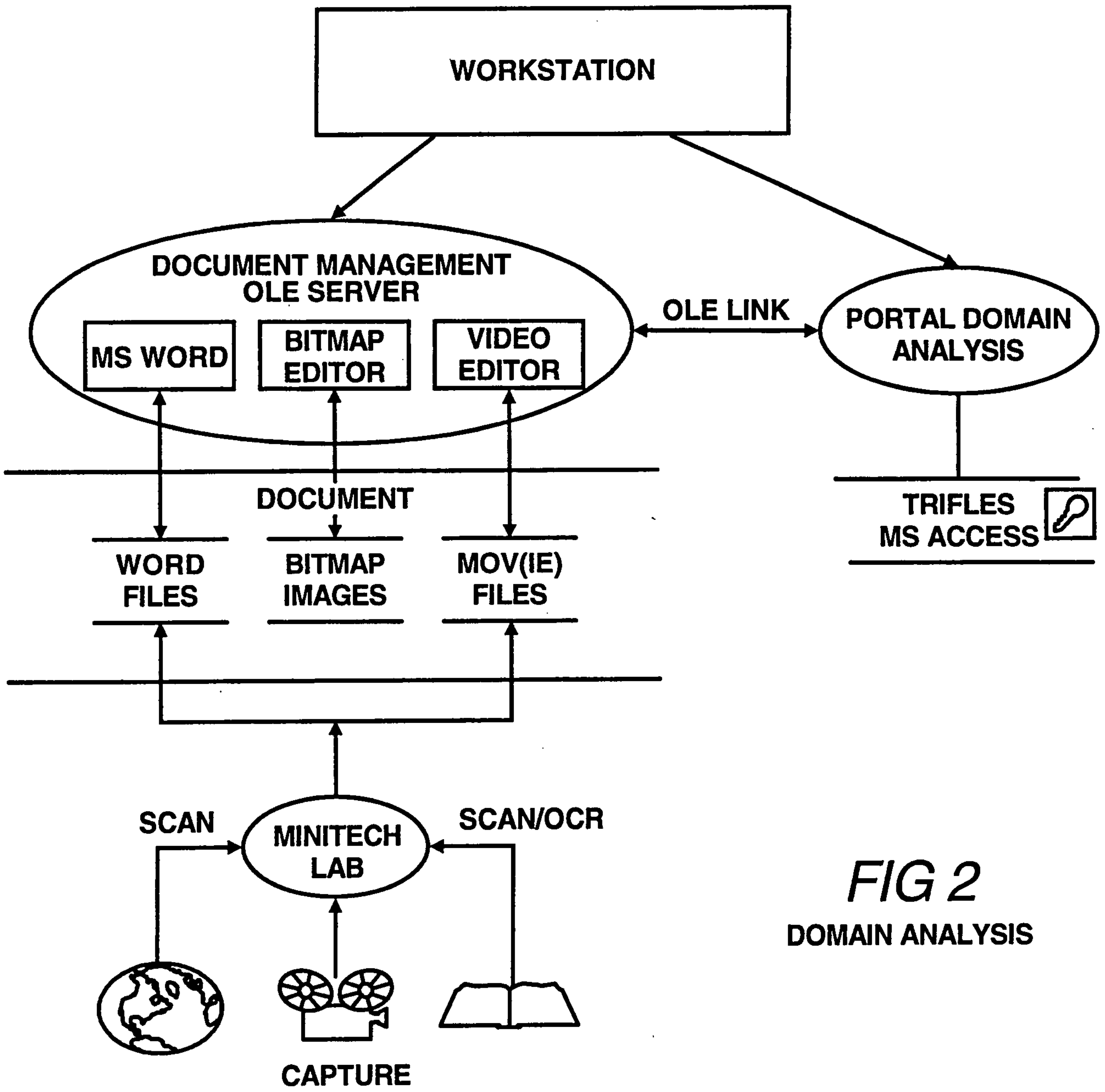


FIG 2

DOMAIN ANALYSIS

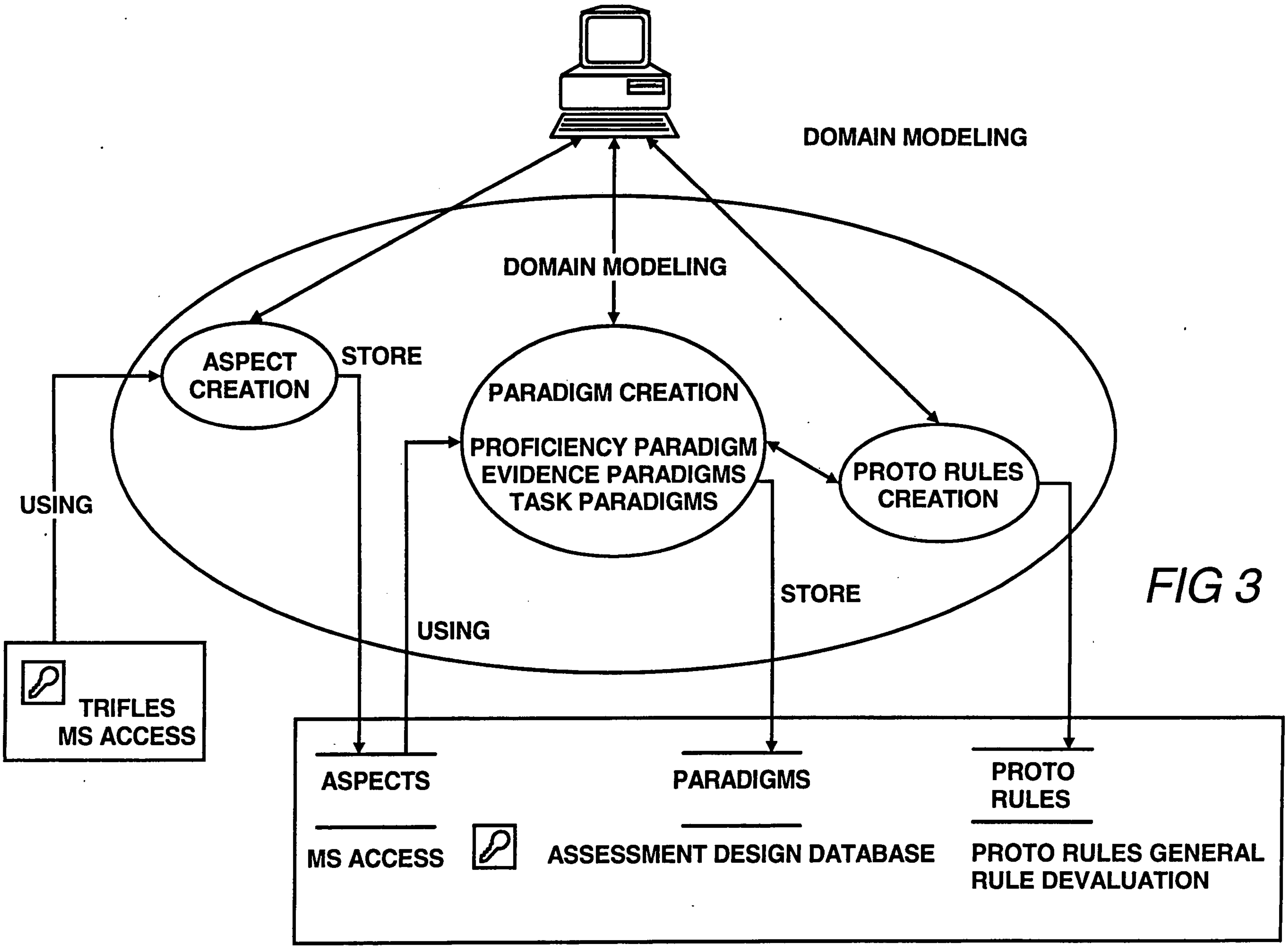

DOMAIN MODELING
DOMAIN MODELING
ASPECT CREATION
STORE
USING
TRIFLES
MS ACCESS
PARADIGM CREATION
PROFICIENCY PARADIGM
EVIDENCE PARADIGMS
TASK PARADIGMS
USING
STORE
PROTO RULES CREATION
ASPECTS
MS ACCESS
PARADIGMS
ASSESSMENT DESIGN DATABASE
PROTO RULES
PROTO RULES GENERAL RULE DEVALUATION

FIG 3

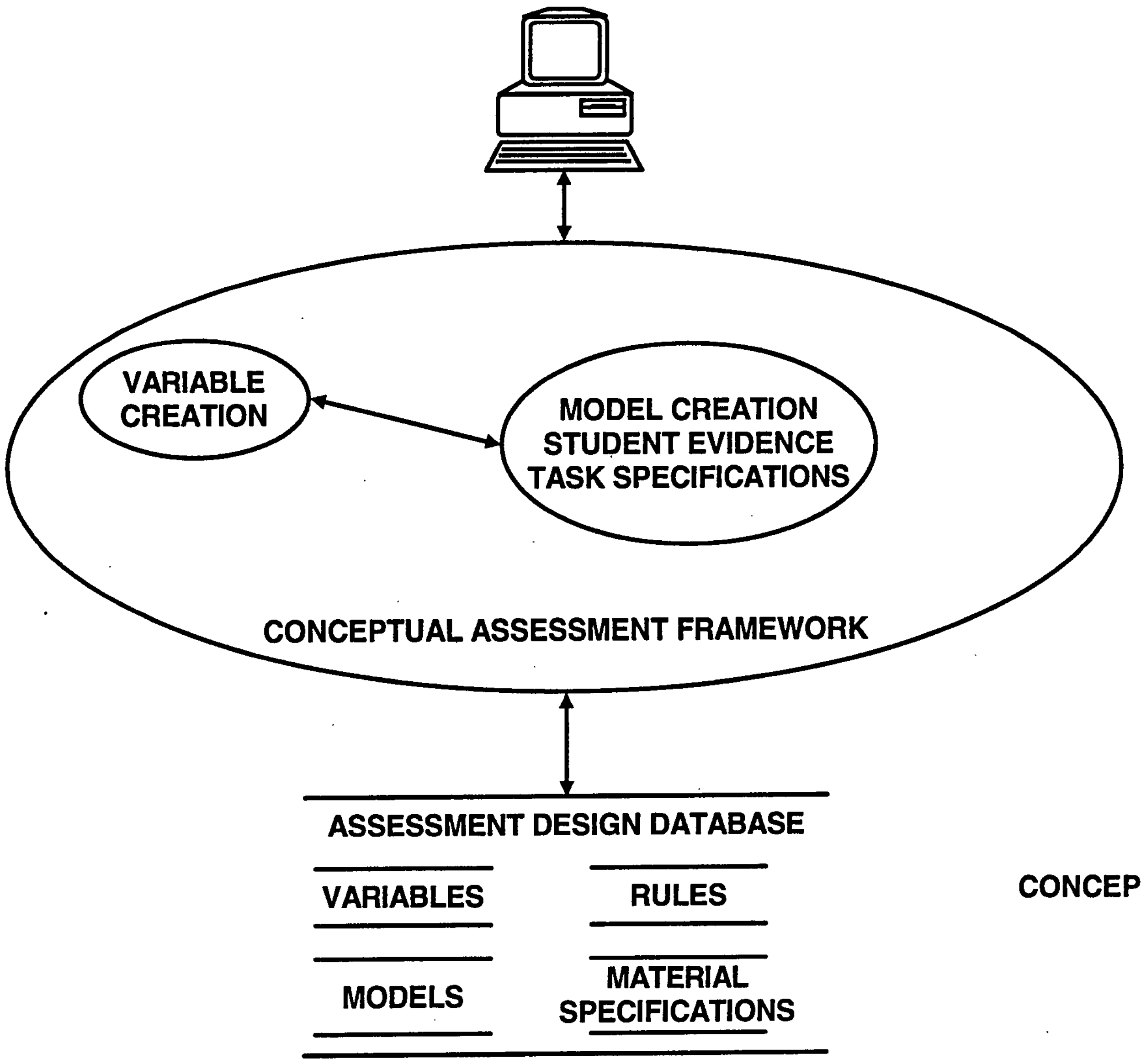
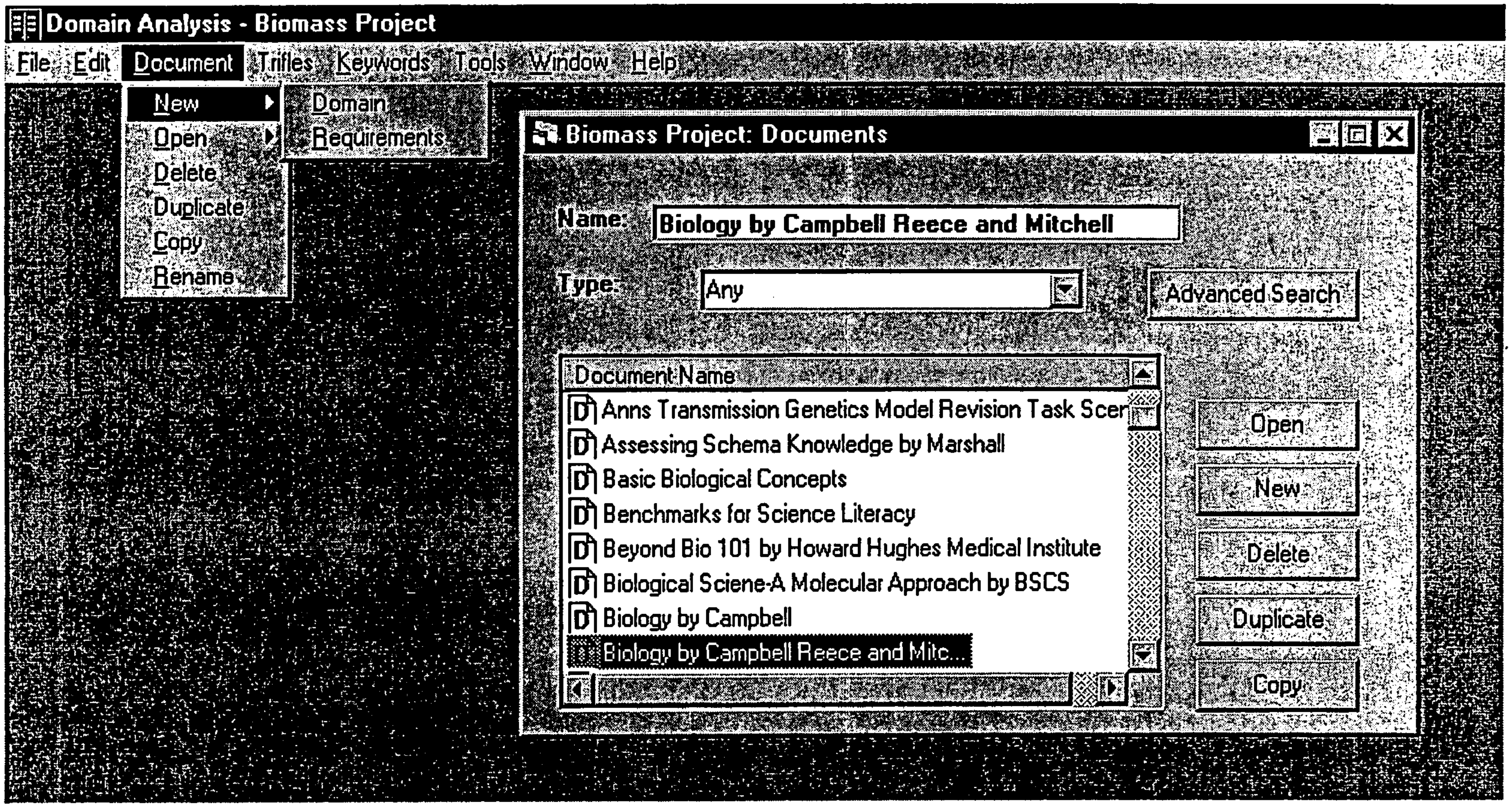


FIG 4

CONCEPTUAL ASSESSMENT FRAMEWORK



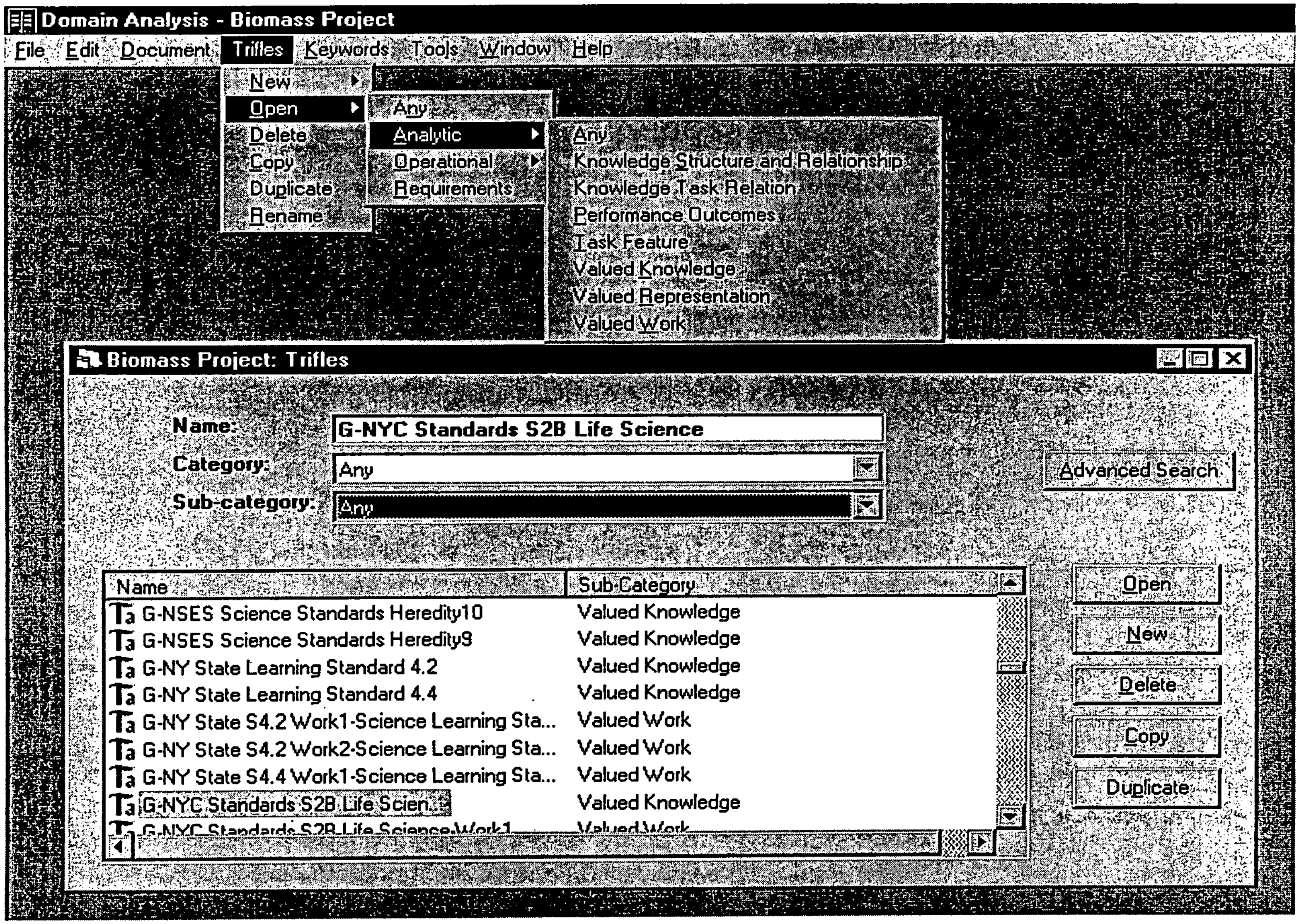
Name: Biology by Campbell Reece and Mitchell

Type: Any

Document Name
- Anns Transmission Genetics Model Revision Task Scer
- Assessing Schema Knowledge by Marshall
- Basic Biological Concepts
- Benchmarks for Science Literacy
- Beyond Bio 101 by Howard Hughes Medical Institute
- Biological Sciene-A Molecular Approach by BSCS
- Biology by Campbell
- Biology by Campbell Reece and Mitc...

DOCUMENT MANAGEMENT FORM

FIG 5



Name: G-NYC Standards S2B Life Science

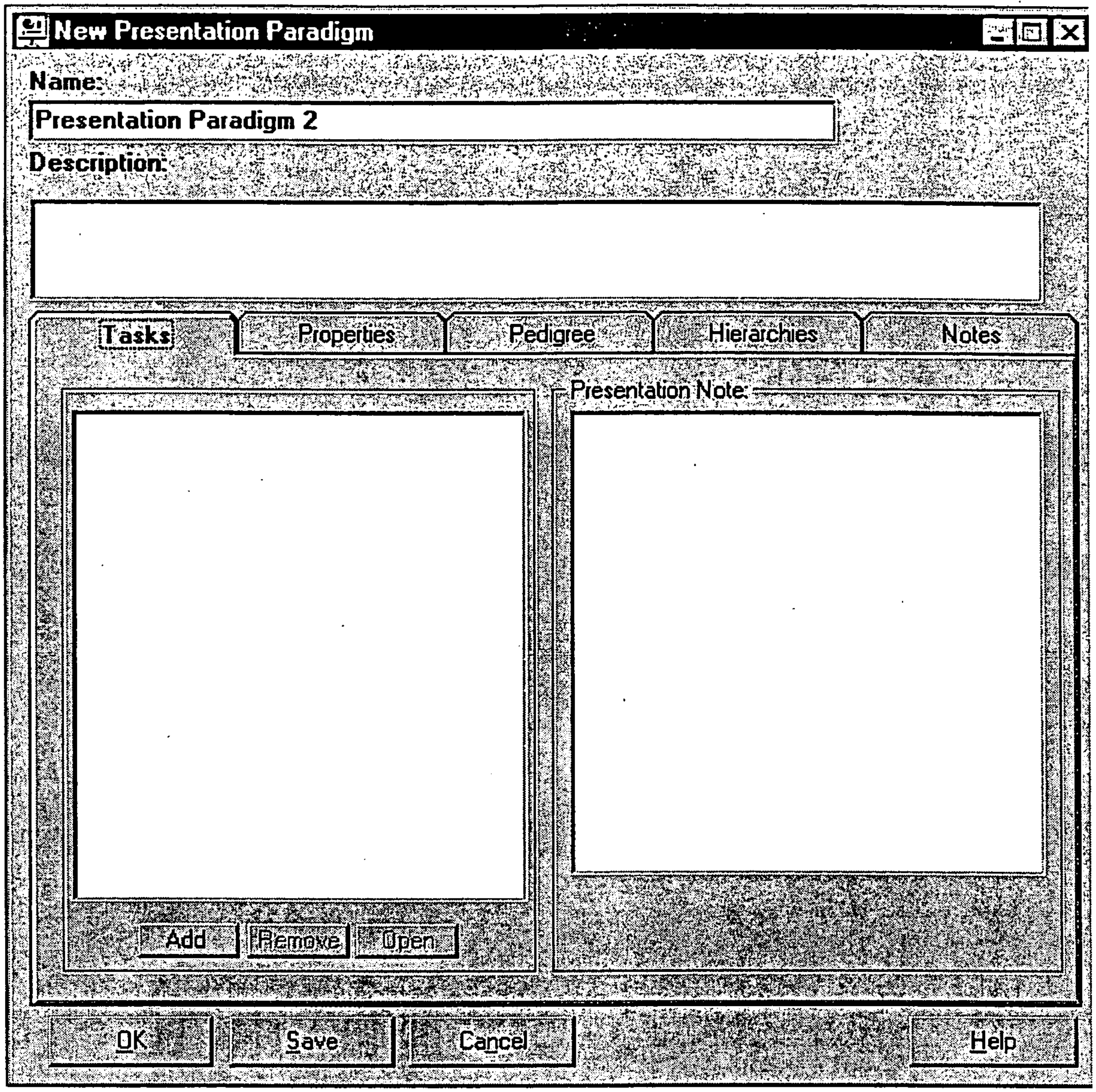
Category: Any

Sub-category: Any

Name	Sub Category
G-NSES Science Standards Heredity10	Valued Knowledge
G-NSES Science Standards Heredity9	Valued Knowledge
G-NY State Learning Standard 4.2	Valued Knowledge
G-NY State Learning Standard 4.4	Valued Knowledge
G-NY State S4.2 Work1-Science Learning Sta...	Valued Work
G-NY State S4.2 Work2-Science Learning Sta...	Valued Work
G-NY State S4.4 Work1-Science Learning Sta...	Valued Work
G-NYC Standards S2B Life Scien...	Valued Knowledge
G-NYC Standards S2B Life Science-Work1	Valued Work

TRIFLE MANAGEMENT FORM

FIG 6



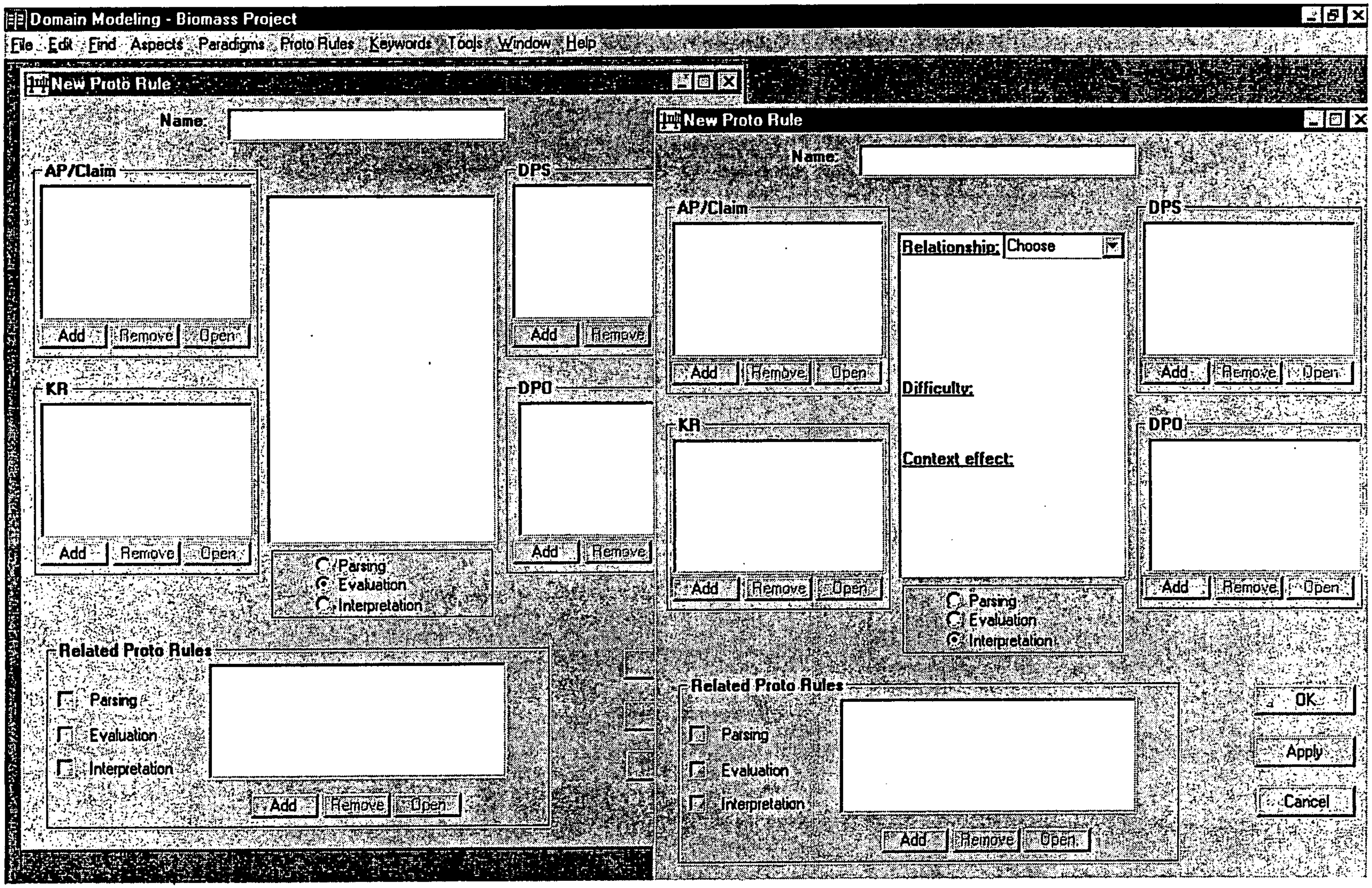
New Presentation Paradigm

Name: Presentation Paradigm 2

Description:

PRESENTATION PARADIGM

FIG 7



○ Parsing
● Evaluation
○ Interpretation

☐ Parsing
☐ Evaluation
☐ Interpretation

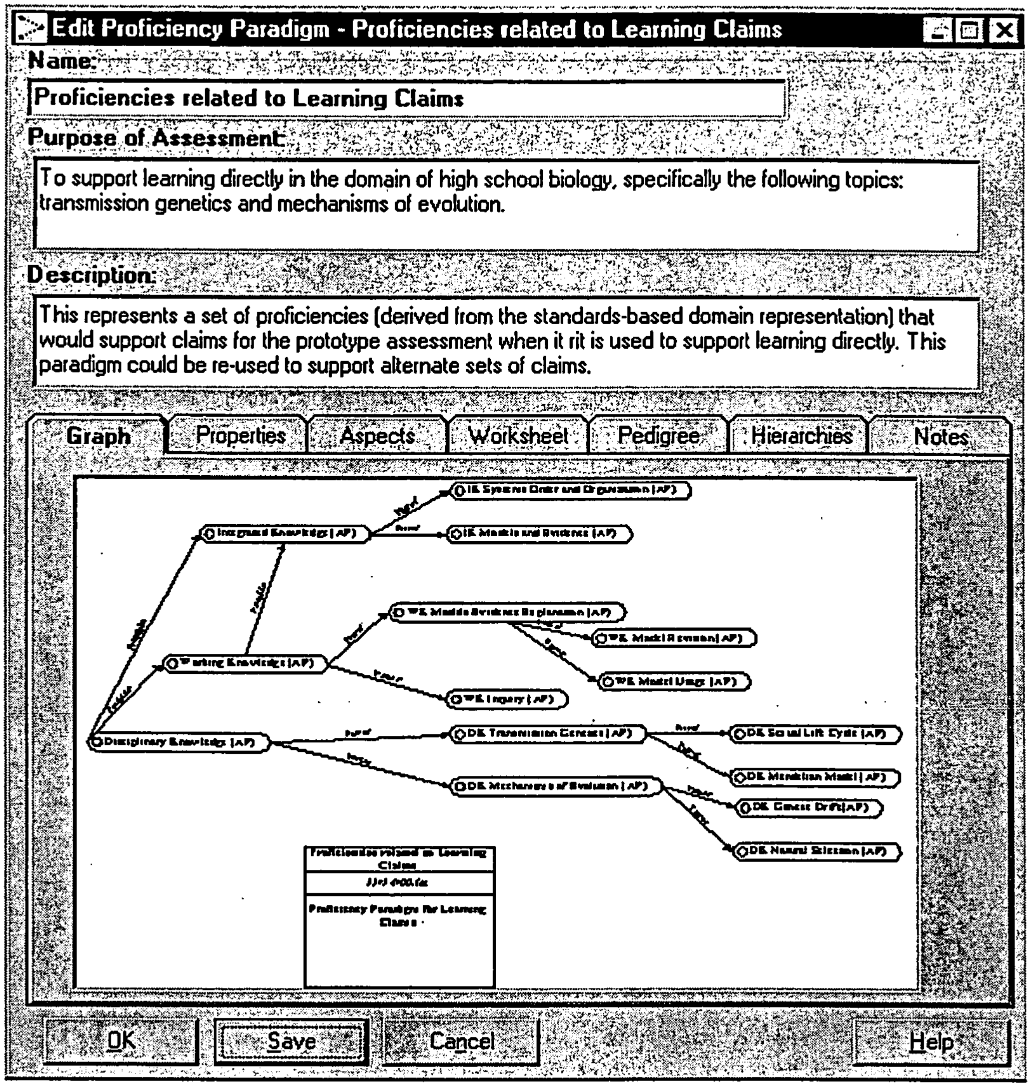
Relationship: Choose

○ Parsing
○ Evaluation
● Interpretation

☐ Parsing
☐ Evaluation
☐ Interpretation

PROTO RULES

FIG 8


Edit Proficiency Paradigm - Proficiencies related to Learning Claims
Graph
Properties
Aspects
Worksheet
Pedigree
Hierarchies
Notes
IK Systems Order and Organization (AP)
Integrated Knowledge (AP)
IK Models and Evidence (AP)
WK Models Evidence Explanation (AP)
WK Model Revision (AP)
Working Knowledge (AP)
WK Model Usage (AP)
WK Inquiry (AP)
Disciplinary Knowledge (AP)
DK Transmission Genetics (AP)
DK Sexual Life Cycle (AP)
DK Mendelian Model (AP)
DK Mechanisms of Evolution (AP)
DK Genetic Drift (AP)
DK Natural Selection (AP)
Proficiencies related to Learning Claims
Proficiency Paradigm for Learning Claims
OK
Save
Cancel
Help

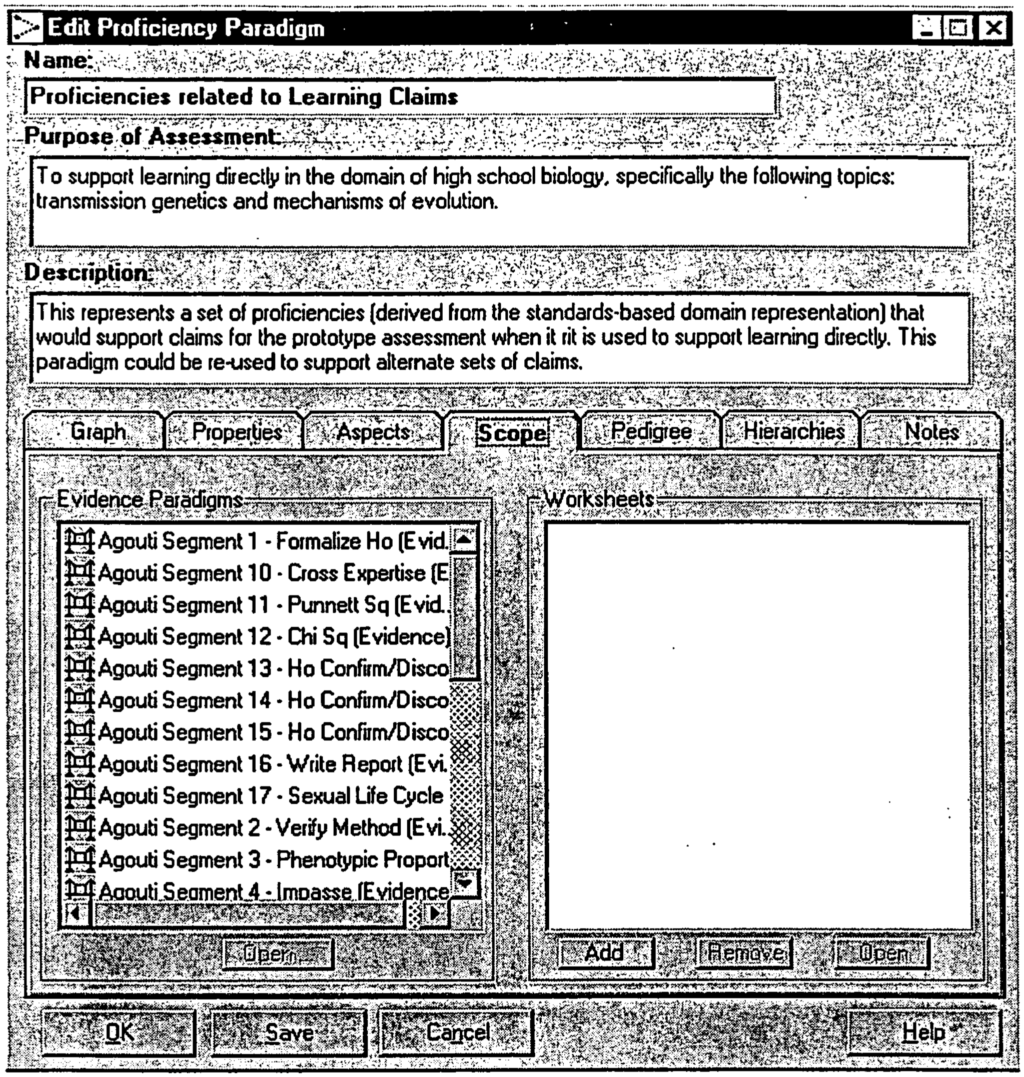
Name:
Proficiencies related to Learning Claims

Purpose of Assessment:
To support learning directly in the domain of high school biology, specifically the following topics: transmission genetics and mechanisms of evolution.

Description:
This represents a set of proficiencies (derived from the standards-based domain representation) that would support claims for the prototype assessment when it rit is used to support learning directly. This paradigm could be re-used to support alternate sets of claims.

PROFICIENCY PARADIGM

FIG 9A



Name:

Proficiencies related to Learning Claims

Purpose of Assessment:

To support learning directly in the domain of high school biology, specifically the following topics: transmission genetics and mechanisms of evolution.

Description:

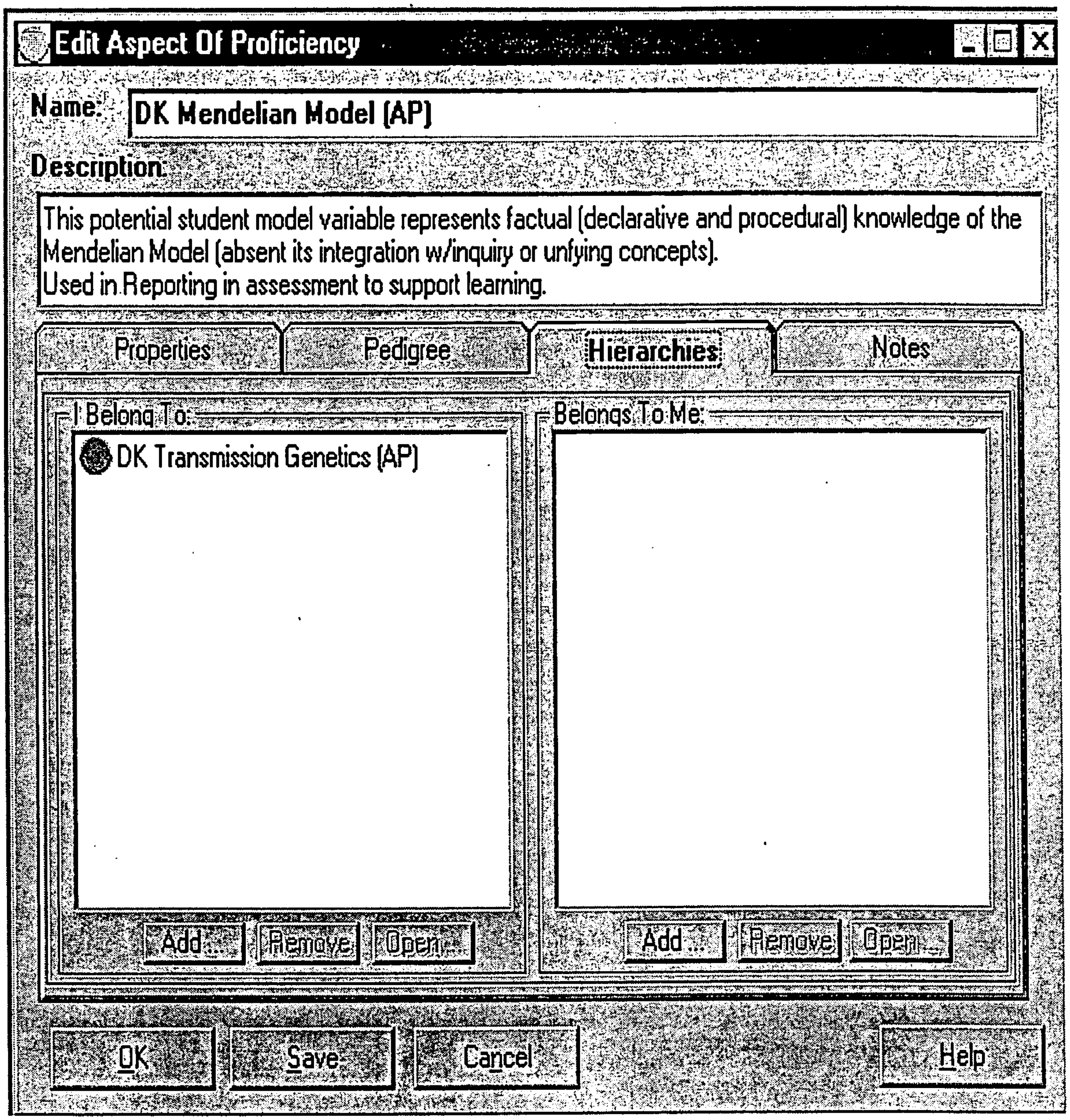
This represents a set of proficiencies (derived from the standards-based domain representation) that would support claims for the prototype assessment when it rit is used to support learning directly. This paradigm could be re-used to support alternate sets of claims.

Evidence Paradigms:

- Agouti Segment 1 - Formalize Ho (Evid.
- Agouti Segment 10 - Cross Expertise (E
- Agouti Segment 11 - Punnett Sq (Evid.
- Agouti Segment 12 - Chi Sq (Evidence)
- Agouti Segment 13 - Ho Confirm/Disco
- Agouti Segment 14 - Ho Confirm/Disco
- Agouti Segment 15 - Ho Confirm/Disco
- Agouti Segment 16 - Write Report (Evi.
- Agouti Segment 17 - Sexual Life Cycle
- Agouti Segment 2 - Verify Method (Evi.
- Agouti Segment 3 - Phenotypic Proport
- Agouti Segment 4 - Impasse (Evidence

PROFICIENCY PARADIGM

FIG 9B



Name: DK Mendelian Model (AP)

Description:

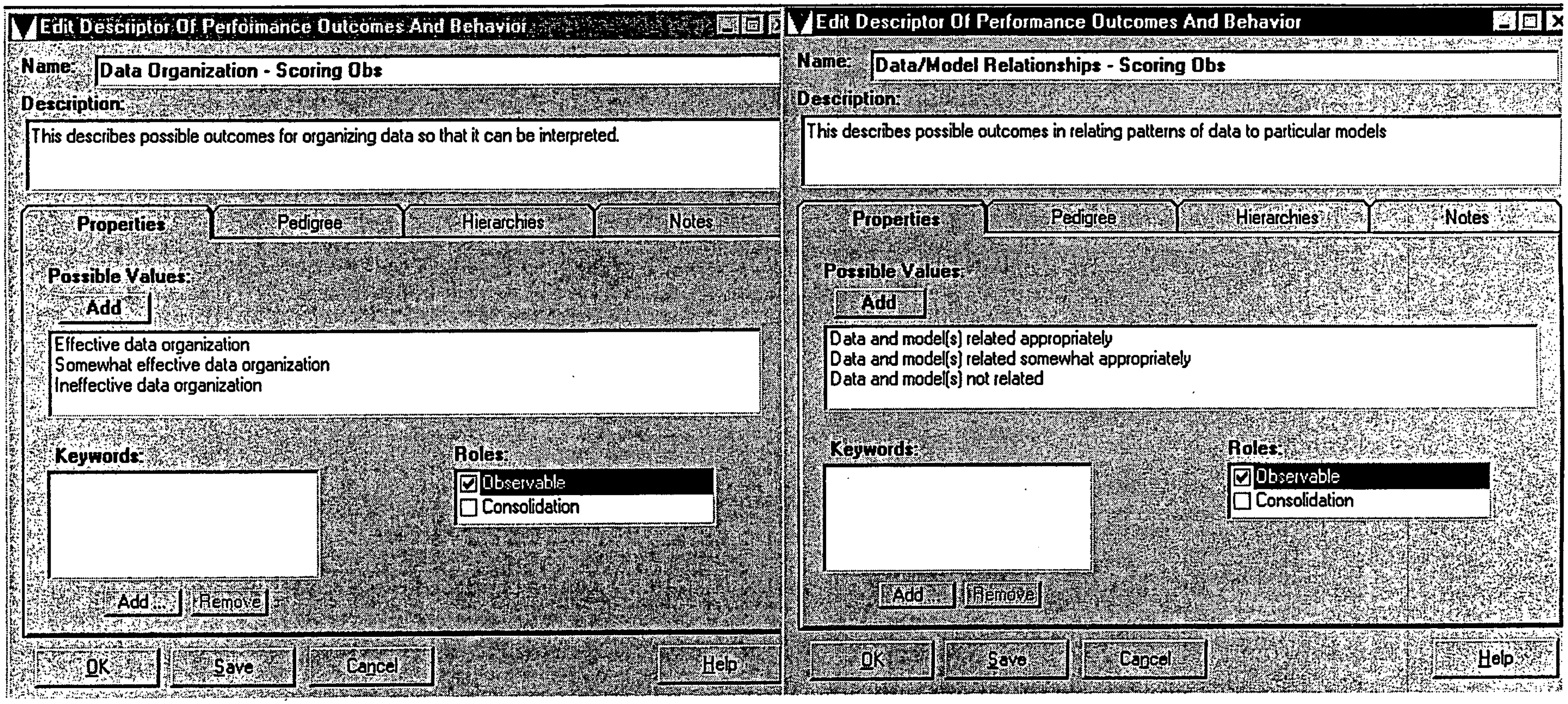
This potential student model variable represents factual (declarative and procedural) knowledge of the Mendelian Model (absent its integration w/inquiry or unfying concepts).
Used in Reporting in assessment to support learning.

I Belong To:
DK Transmission Genetics (AP)

Belongs To Me:

AN EXAMPLE OF AN ASPECT OF PROFICIENCY

FIG 9C



Name: Data Organization - Scoring Obs

Description: This describes possible outcomes for organizing data so that it can be interpreted.

Possible Values:

Effective data organization
Somewhat effective data organization
Ineffective data organization

Keywords:

Roles:

☑ Observable
☐ Consolidation

Name: Data/Model Relationships - Scoring Obs

Description: This describes possible outcomes in relating patterns of data to particular models

Possible Values:

Data and model(s) related appropriately
Data and model(s) related somewhat appropriately
Data and model(s) not related

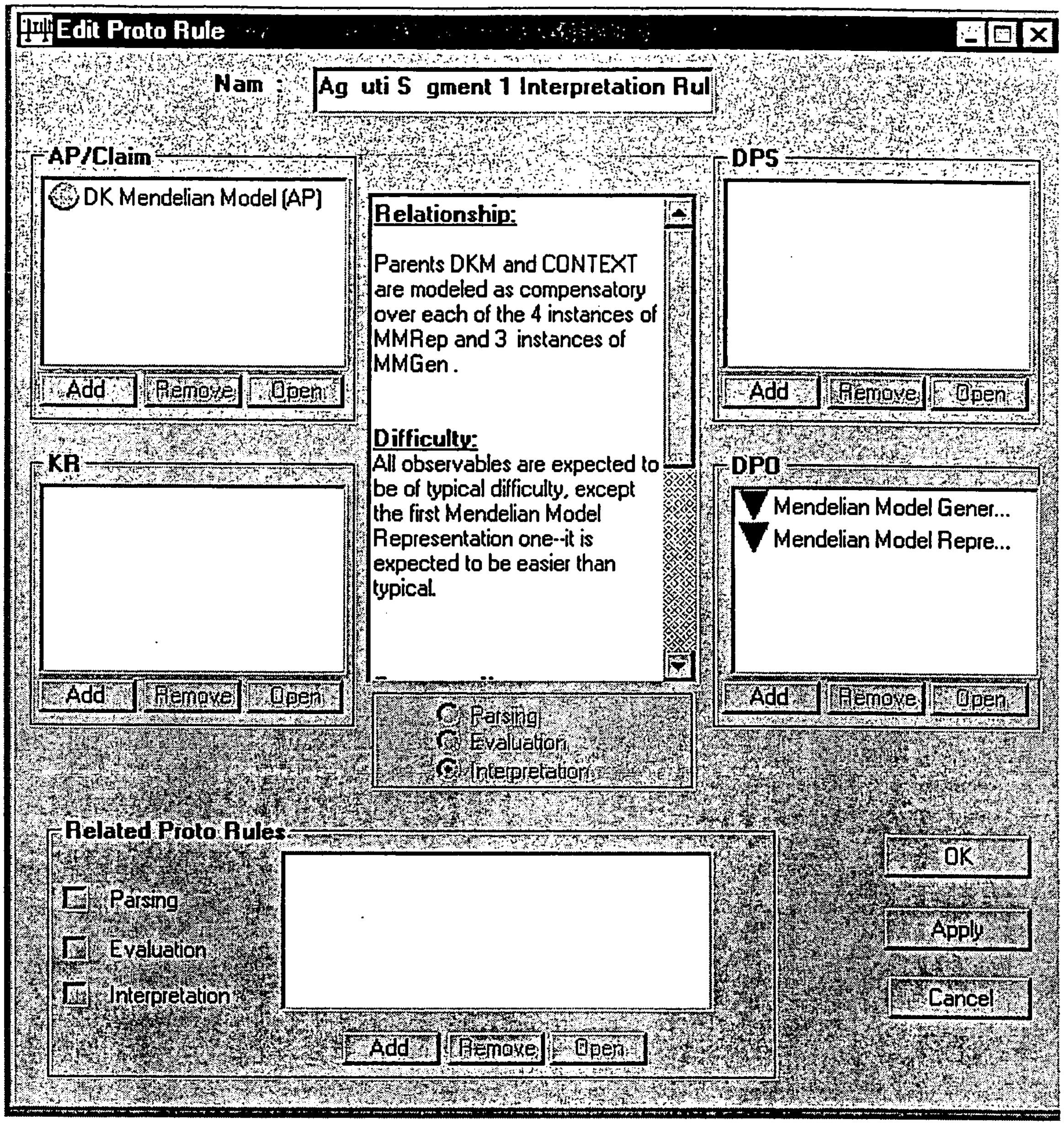
Keywords:

Roles:

☑ Observable
☐ Consolidation

EXAMPLES OF DESCRIPTORS OF PERFORMANCE OUTCOMES / BEHAVIORS

FIG 10



Name : Agouti Segment 1 Interpretation Rul

AP/Claim

DK Mendelian Model (AP)

Relationship:

Parents DKM and CONTEXT are modeled as compensatory over each of the 4 instances of MMRep and 3 instances of MMGen.

Difficulty:

All observables are expected to be of typical difficulty, except the first Mendelian Model Representation one--it is expected to be easier than typical.

○ Parsing
○ Evaluation
● Interpretation

DPO

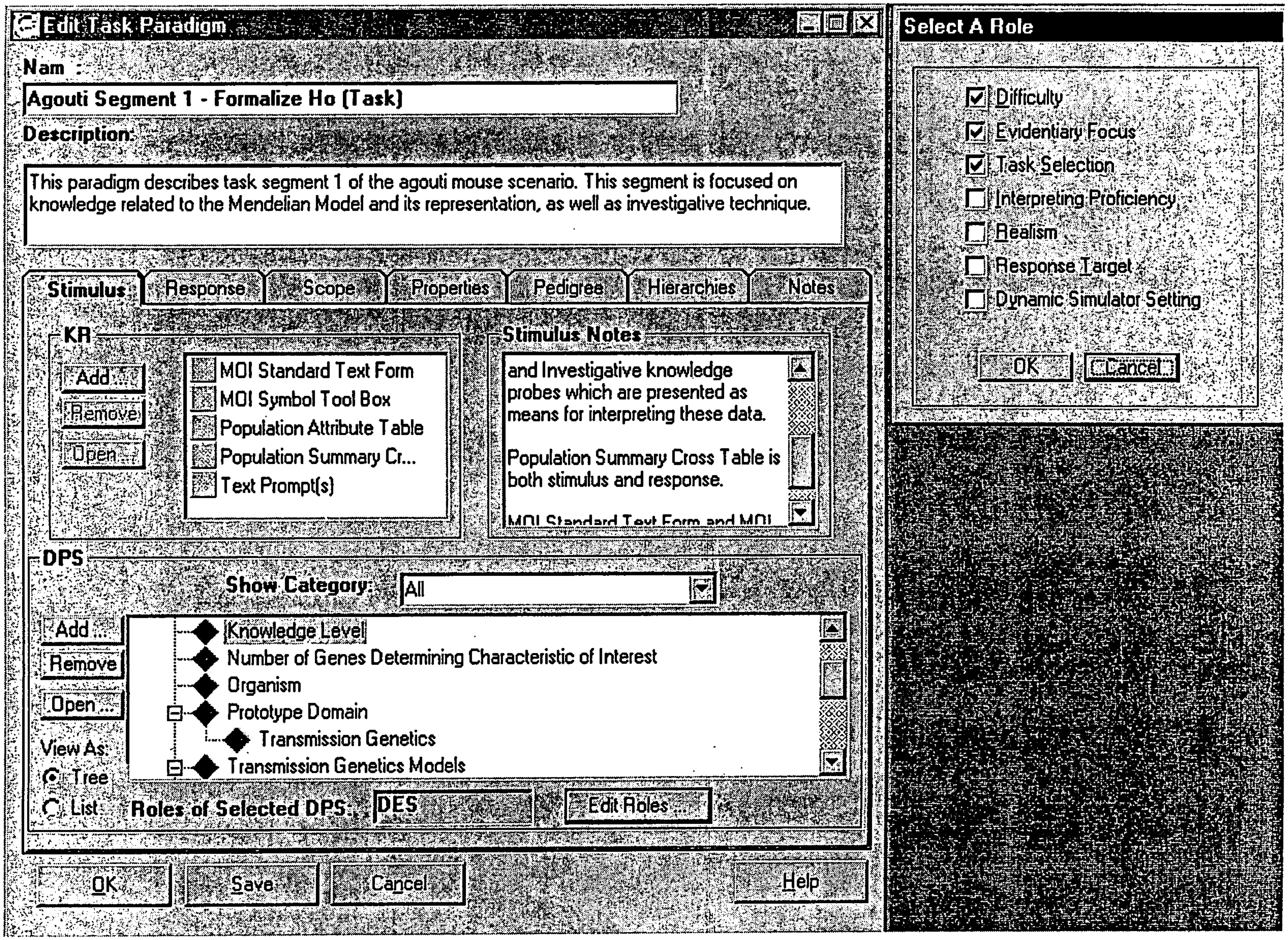
▼ Mendelian Model Gener...
▼ Mendelian Model Repre...

Related Proto Rules

☐ Parsing
☐ Evaluation
☐ Interpretation

AN EXAMPLE INTERPRETATION PROTO RULE

FIG 11



Nam : Agouti Segment 1 - Formalize Ho (Task)

Description: This paradigm describes task segment 1 of the agouti mouse scenario. This segment is focused on knowledge related to the Mendelian Model and its representation, as well as investigative technique.

KR:
- MOI Standard Text Form
- MOI Symbol Tool Box
- Population Attribute Table
- Population Summary Cr...
- Text Prompt(s)

Stimulus Notes:

and Investigative knowledge probes which are presented as means for interpreting these data.

Population Summary Cross Table is both stimulus and response.

MOI Standard Text Form and MOI

Show Category: All

- Knowledge Level
- Number of Genes Determining Characteristic of Interest
- Organism
- Prototype Domain
  - Transmission Genetics
- Transmission Genetics Models

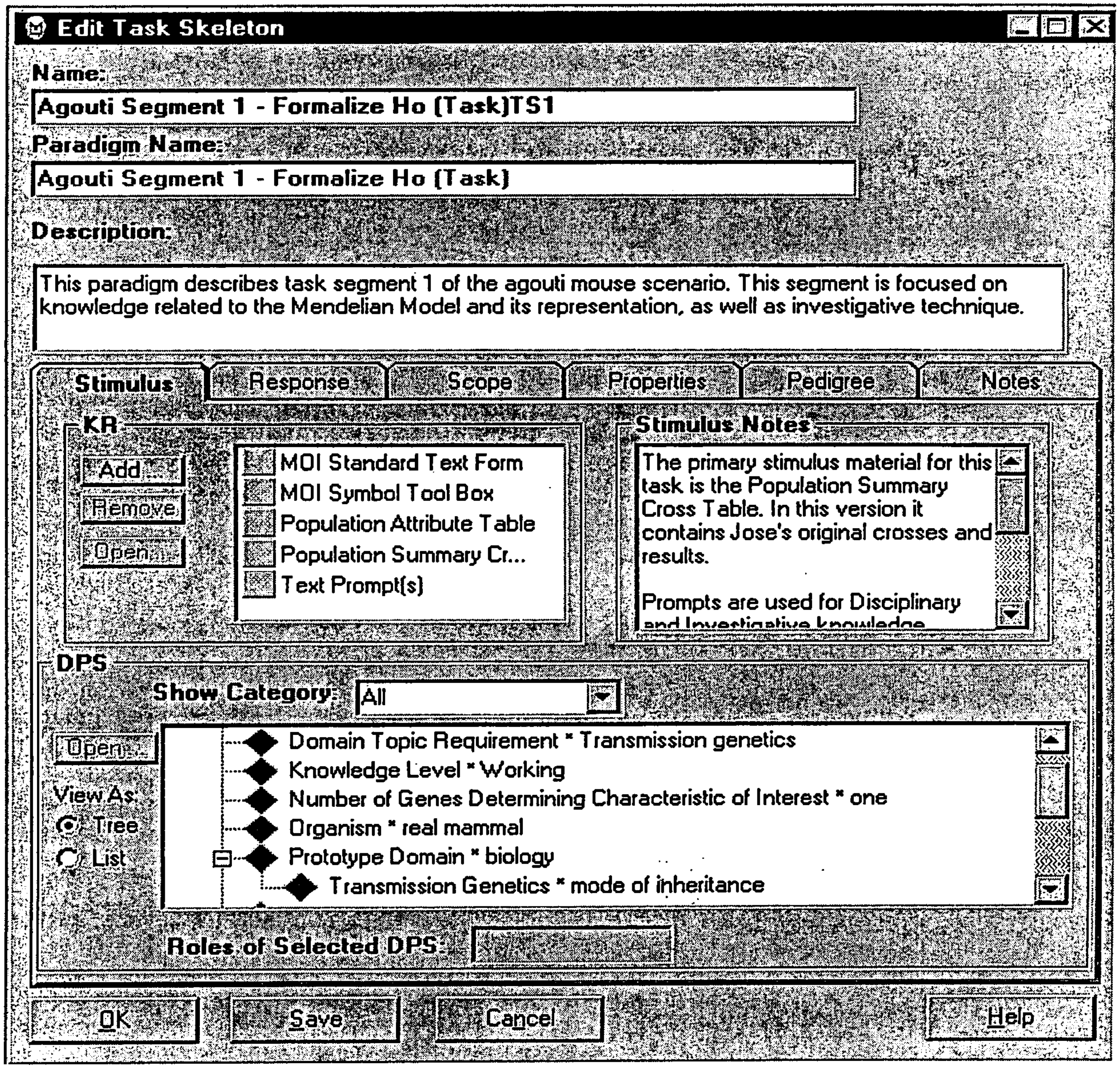
View As: ● Tree ○ List

Roles of Selected DPS: DES

☑ Difficulty
☑ Evidentiary Focus
☑ Task Selection
☐ Interpreting Proficiency
☐ Realism
☐ Response Target
☐ Dynamic Simulator Setting

EXAMPLE ROLES OF DESCRIPTORS OF PERFORMANCE SITUATIONS IN A TASK PARADIGM

FIG 12



Name: Agouti Segment 1 - Formalize Ho (Task)TS1

Paradigm Name: Agouti Segment 1 - Formalize Ho (Task)

Description: This paradigm describes task segment 1 of the agouti mouse scenario. This segment is focused on knowledge related to the Mendelian Model and its representation, as well as investigative technique.

KR

- MOI Standard Text Form
- MOI Symbol Tool Box
- Population Attribute Table
- Population Summary Cr...
- Text Prompt(s)

Stimulus Notes: The primary stimulus material for this task is the Population Summary Cross Table. In this version it contains Jose's original crosses and results.

Prompts are used for Disciplinary and Investigative knowledge

DPS

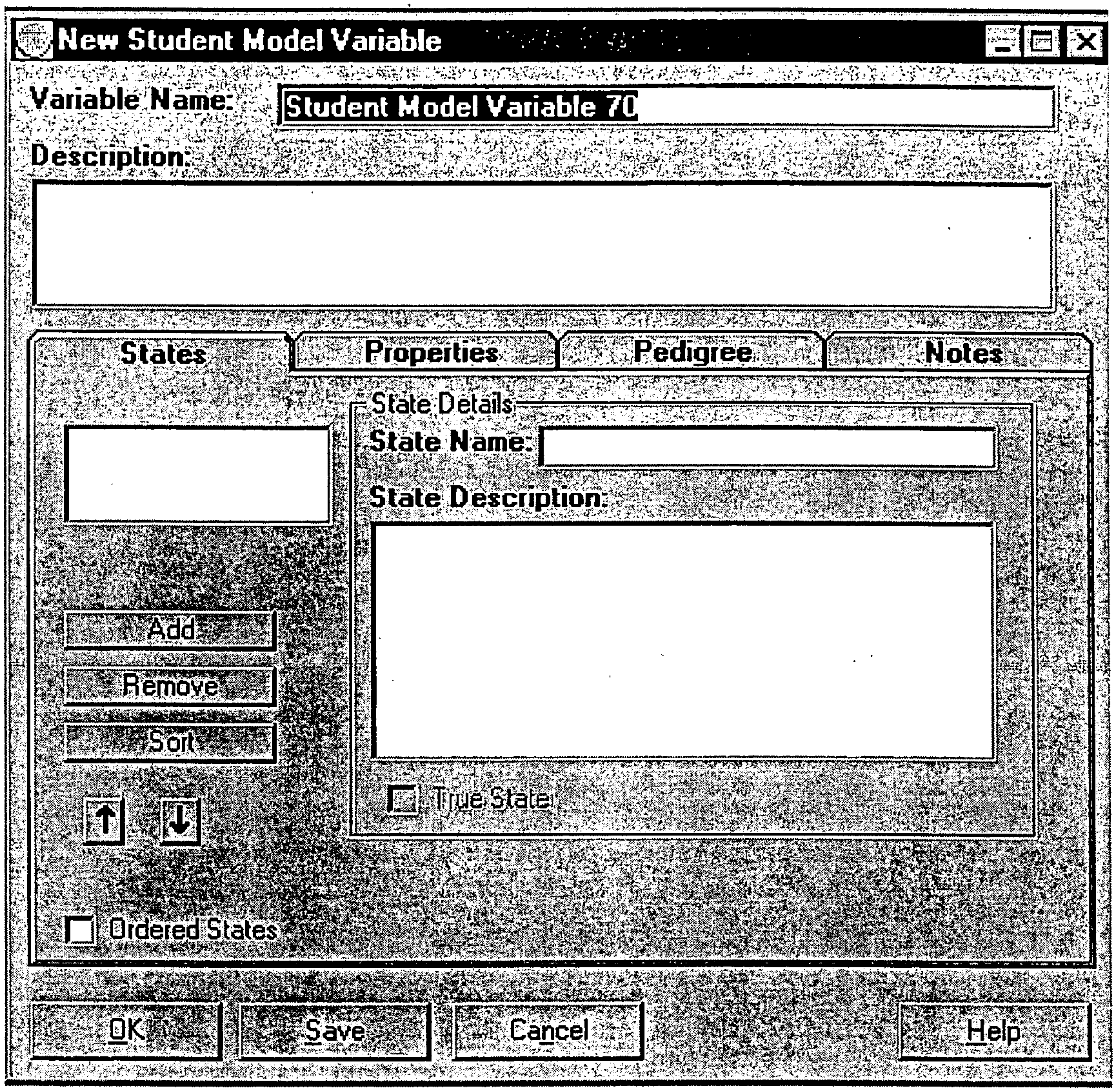
Show Category: All

View As:
● Tree
○ List

- Domain Topic Requirement * Transmission genetics
- Knowledge Level * Working
- Number of Genes Determining Characteristic of Interest * one
- Organism * real mammal
- Prototype Domain * biology
  - Transmission Genetics * mode of inheritance

Roles of Selected DPS:

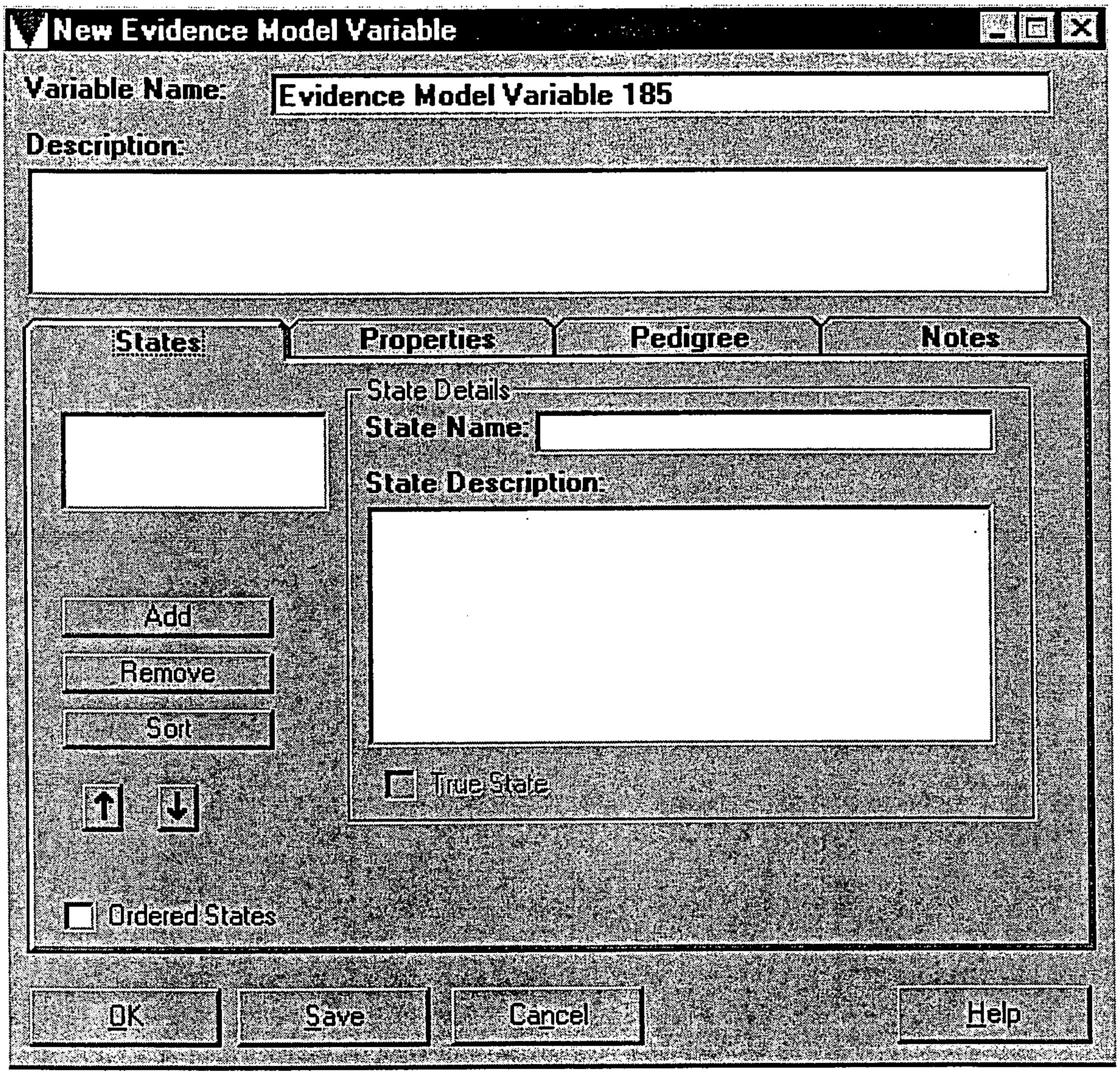
FIG 13



Variable Name: Student Model Variable 70

STUDENT MODEL VARIABLE

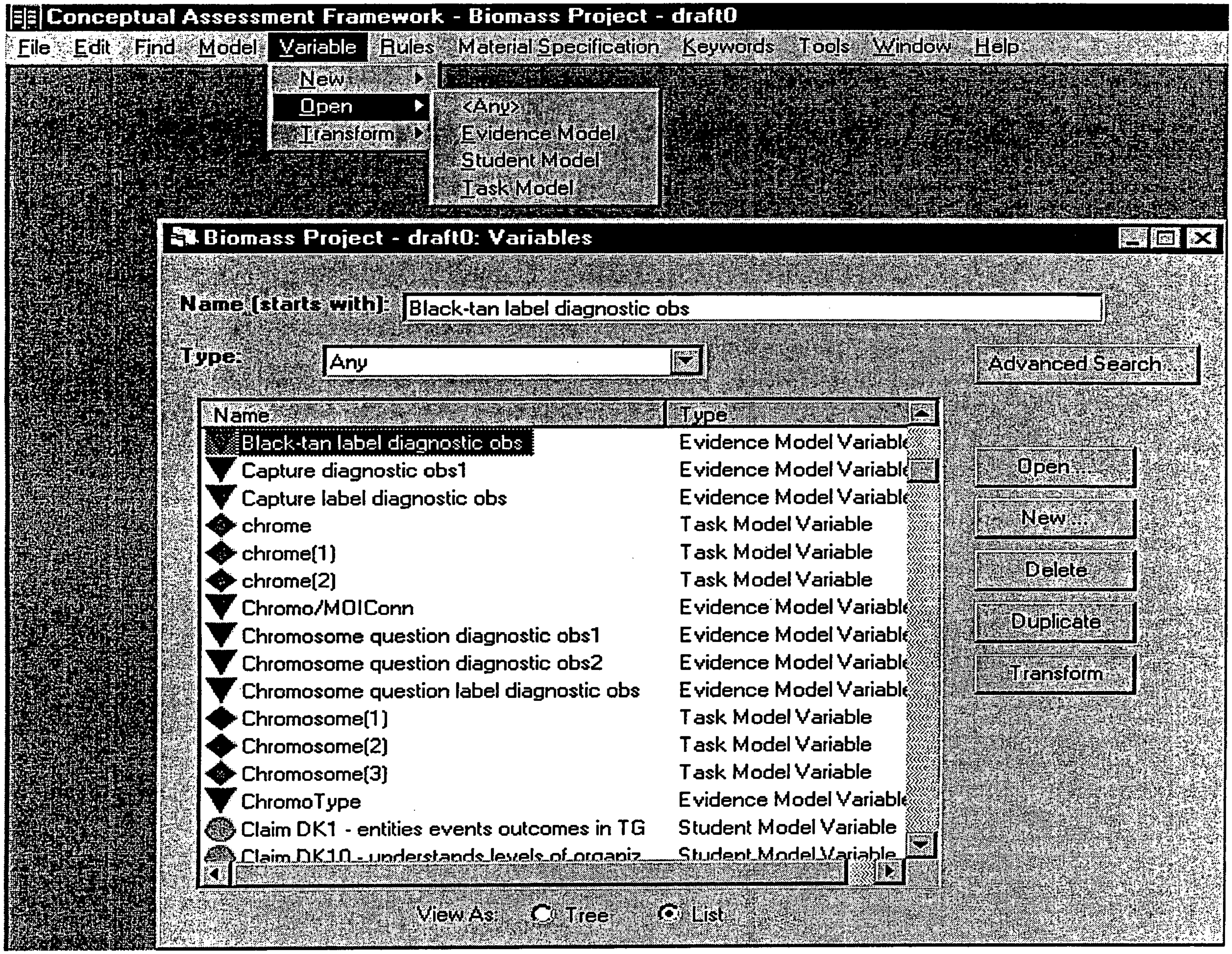
FIG 14



Variable Name: Evidence Model Variable 185

EVIDENCE MODEL VARIABLE

FIG 15



Name (starts with): Black-tan label diagnostic obs

Type: Any

Name	Type
▼ Black-tan label diagnostic obs	Evidence Model Variabl
▼ Capture diagnostic obs1	Evidence Model Variabl
▼ Capture label diagnostic obs	Evidence Model Variabl
◆ chrome	Task Model Variable
◆ chrome(1)	Task Model Variable
◆ chrome(2)	Task Model Variable
▼ Chromo/MOIConn	Evidence Model Variabl
▼ Chromosome question diagnostic obs1	Evidence Model Variabl
▼ Chromosome question diagnostic obs2	Evidence Model Variabl
▼ Chromosome question label diagnostic obs	Evidence Model Variabl
◆ Chromosome(1)	Task Model Variable
◆ Chromosome(2)	Task Model Variable
◆ Chromosome(3)	Task Model Variable
▼ ChromoType	Evidence Model Variabl
● Claim DK1 - entities events outcomes in TG	Student Model Variable
● Claim DK10 - understands levels of organiz	Student Model Variable

View As: ○ Tree ● List

FIG 16

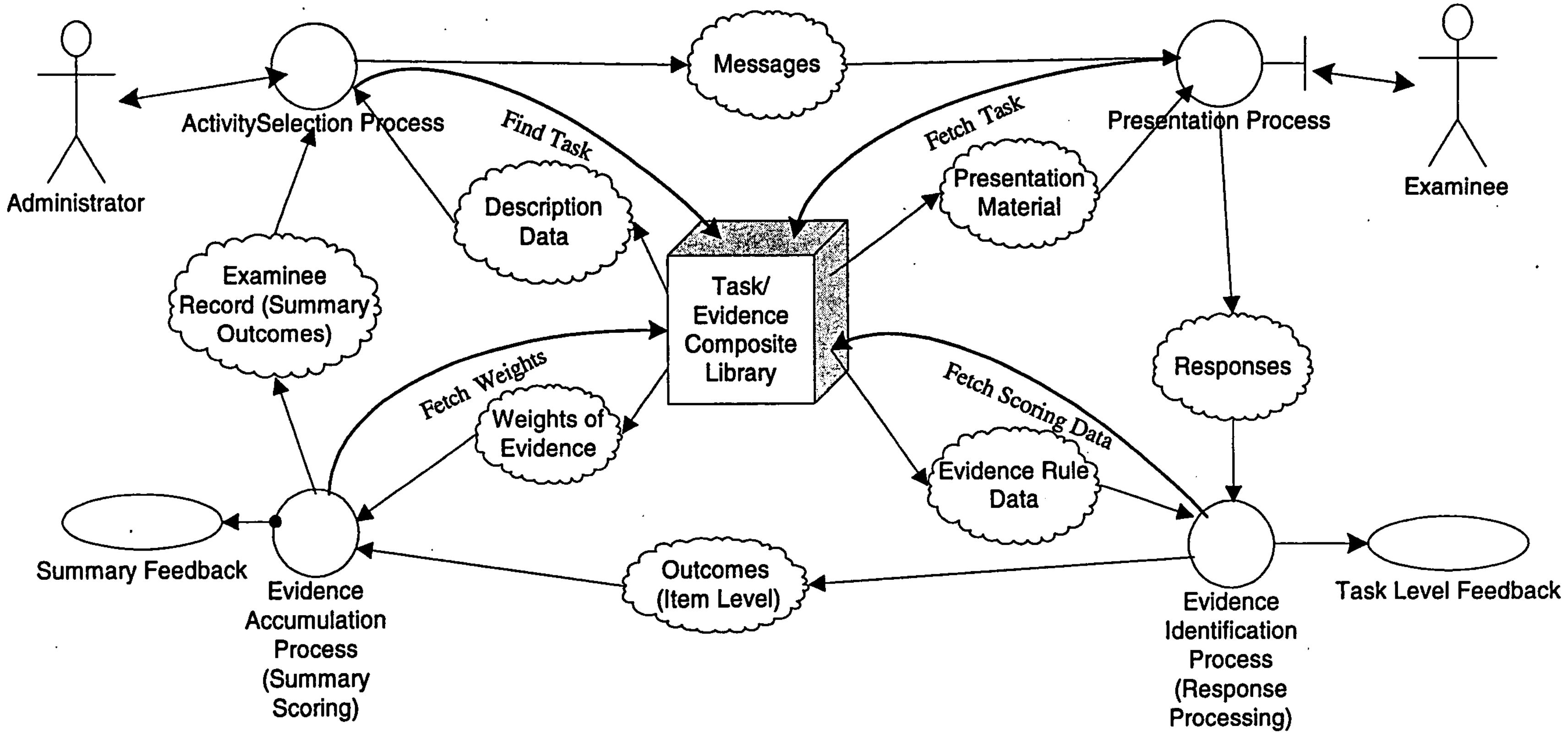

Administrator
ActivitySelection Process
Messages
Presentation Process
Examinee
Find Task
Fetch Task
Description Data
Presentation Material
Examinee Record (Summary Outcomes)
Task/ Evidence Composite Library
Responses
Fetch Weights
Weights of Evidence
Fetch Scoring Data
Evidence Rule Data
Summary Feedback
Evidence Accumulation Process (Summary Scoring)
Outcomes (Item Level)
Evidence Identification Process (Response Processing)
Task Level Feedback

FIG 17

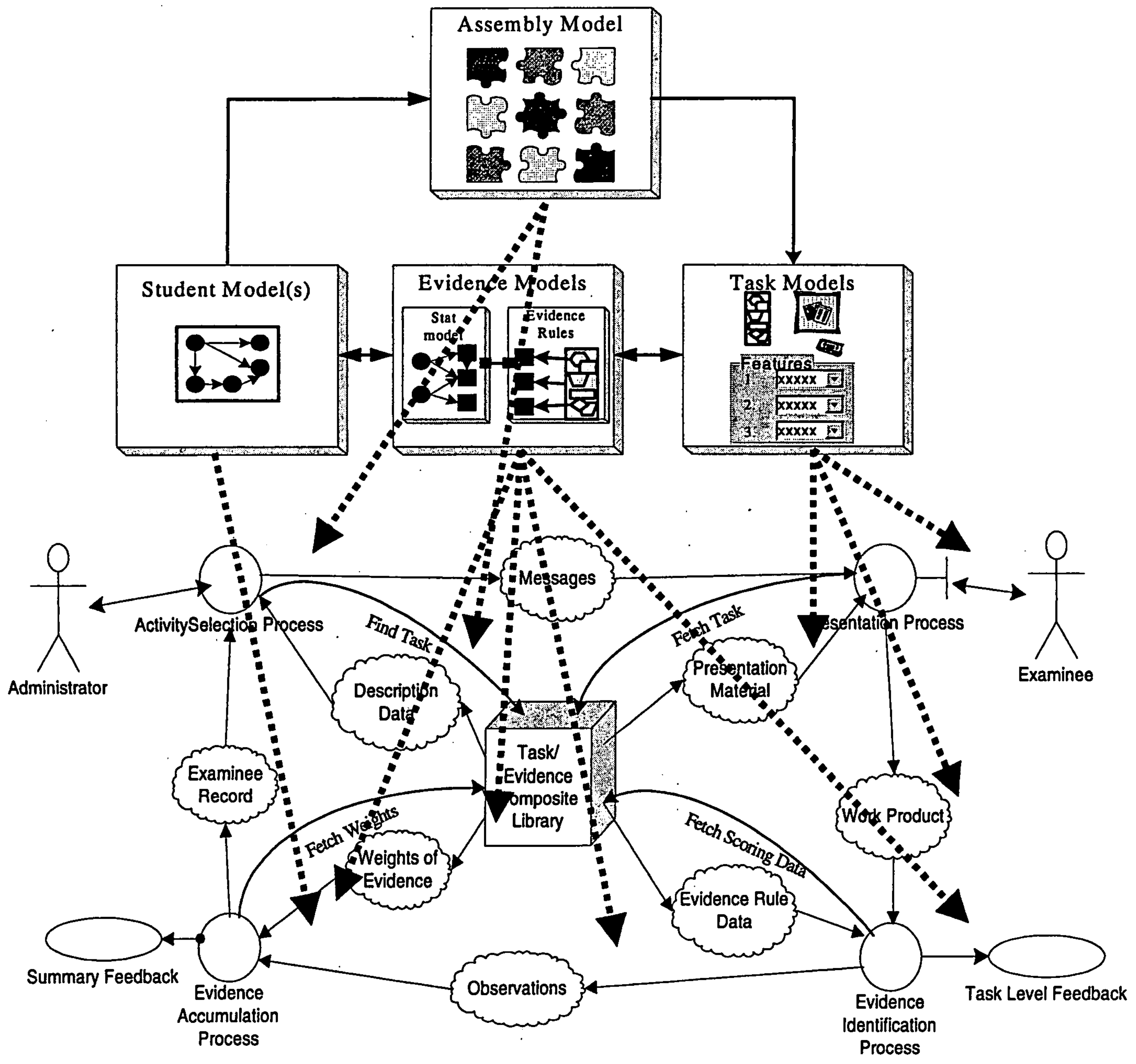

Assembly Model
Student Model(s)
Evidence Models
Stat model
Evidence Rules
Task Models
Features
1. xxxxx
2. xxxxx
3. xxxxx
Administrator
ActivitySelection Process
Messages
Presentation Process
Examinee
Find Task
Fetch Task
Description Data
Presentation Material
Task/ Evidence Composite Library
Examinee Record
Fetch Weights
Weights of Evidence
Fetch Scoring Data
Work Product
Evidence Rule Data
Summary Feedback
Evidence Accumulation Process
Observations
Evidence Identification Process
Task Level Feedback

FIG 18

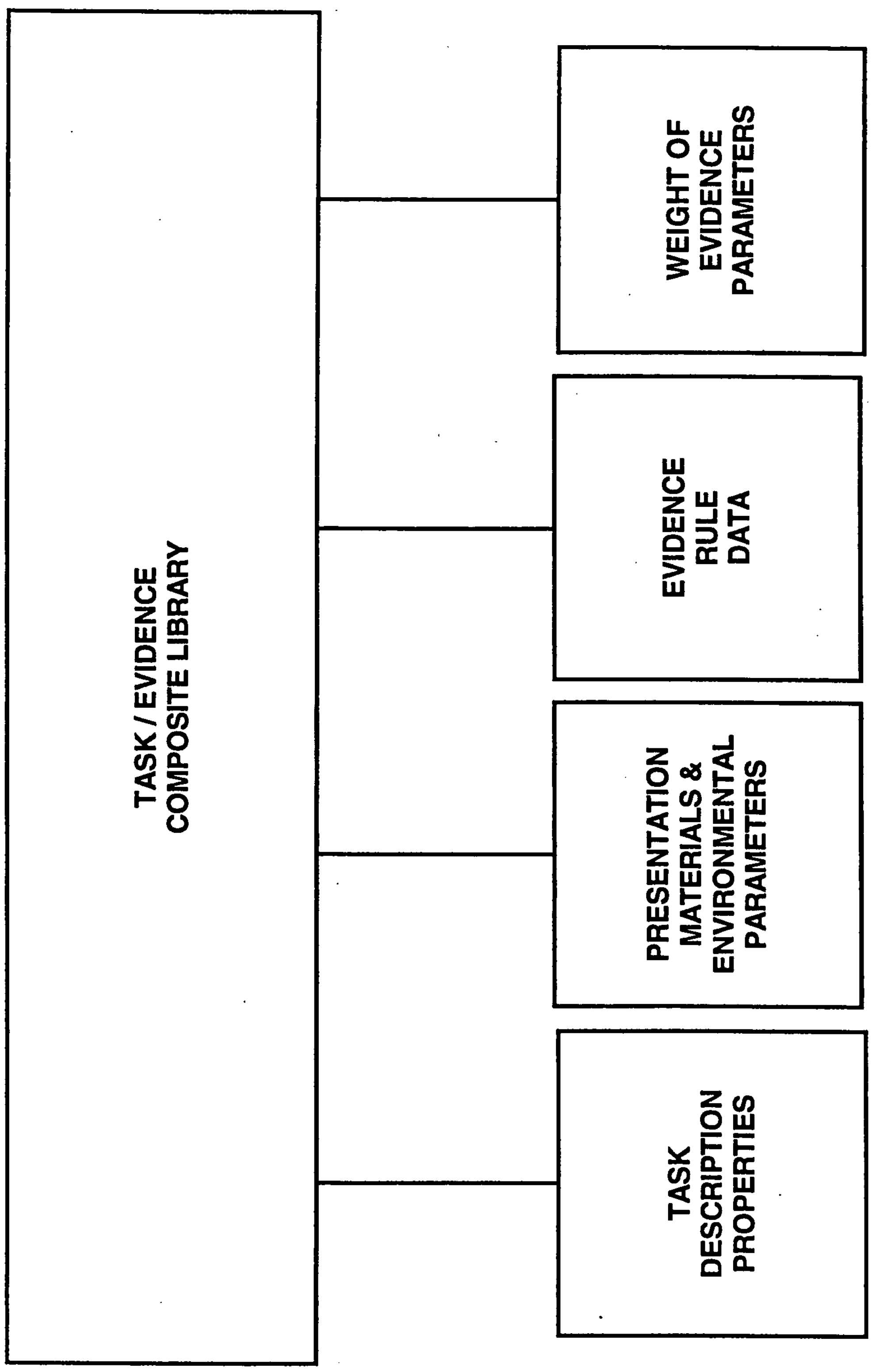
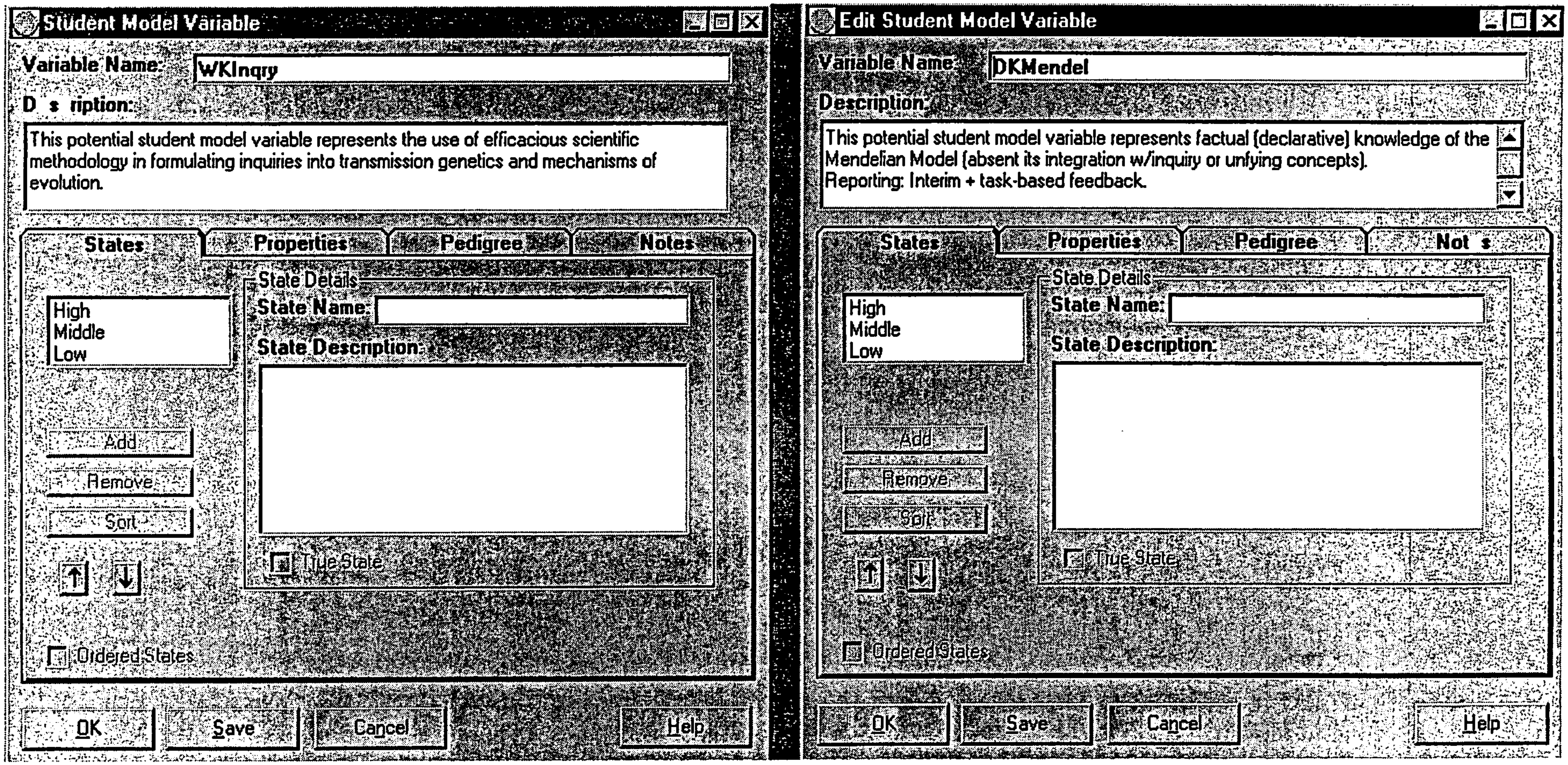

TASK / EVIDENCE COMPOSITE LIBRARY
TASK DESCRIPTION PROPERTIES
PRESENTATION MATERIALS & ENVIRONMENTAL PARAMETERS
EVIDENCE RULE DATA
WEIGHT OF EVIDENCE PARAMETERS

FIG 19



Student Model Variable

Variable Name: WKInqry

Description:

This potential student model variable represents the use of efficacious scientific methodology in formulating inquiries into transmission genetics and mechanisms of evolution.

Edit Student Model Variable

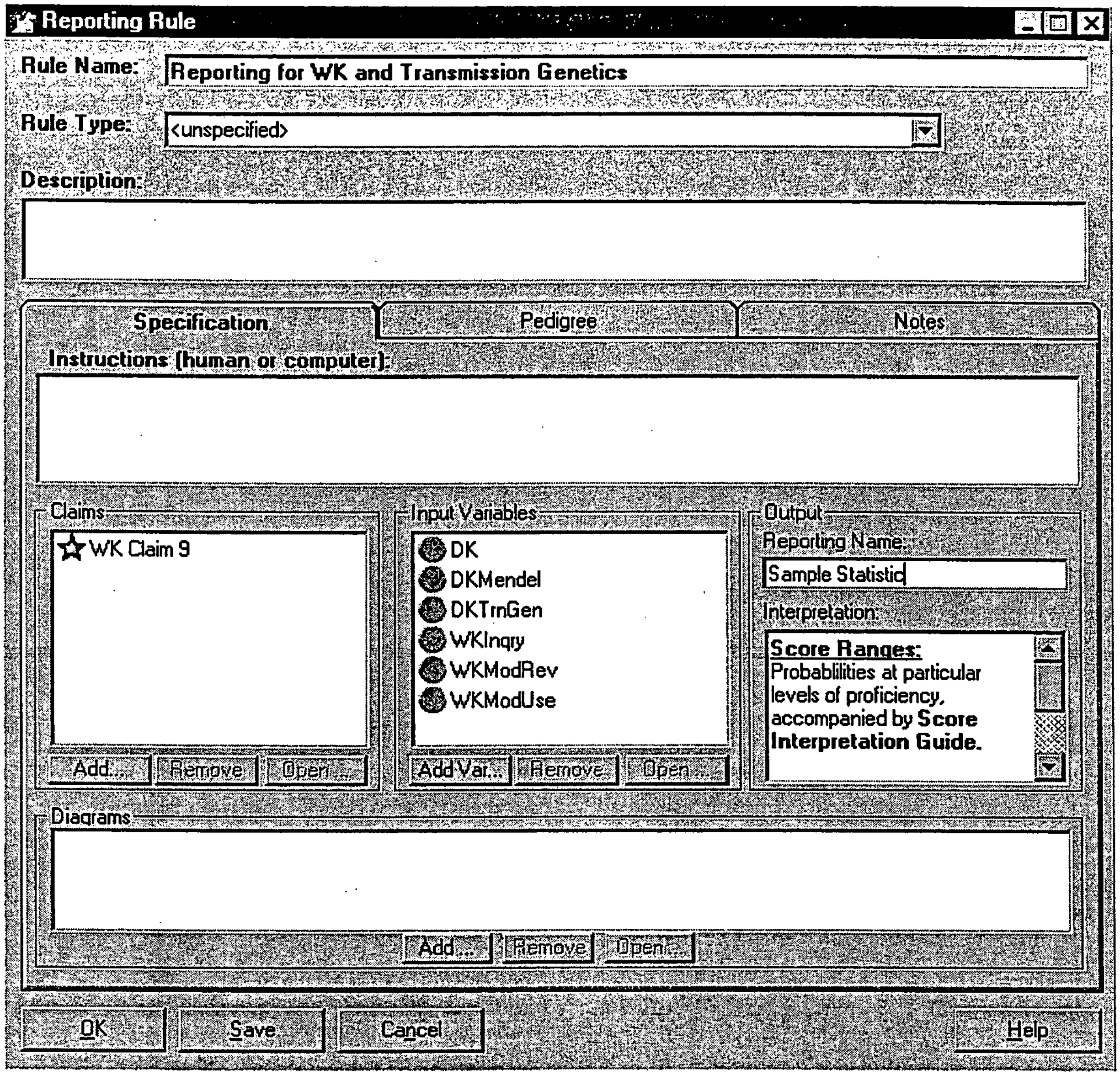
Variable Name: DKMendel

Description:

This potential student model variable represents factual (declarative) knowledge of the Mendelian Model (absent its integration w/inquiry or unfying concepts).
Reporting: Interim + task-based feedback.

EXAMPLE STUDENT MODEL VARIABLES WITH STATES

FIG 20



Reporting Rule

Rule Name: Reporting for WK and Transmission Genetics

Rule Type: <unspecified>

Description:

Instructions (human or computer):

Claims:
- WK Claim 9

Input Variables:
- DK
- DKMendel
- DKTrnGen
- WKInqry
- WKModRev
- WKModUse

Output

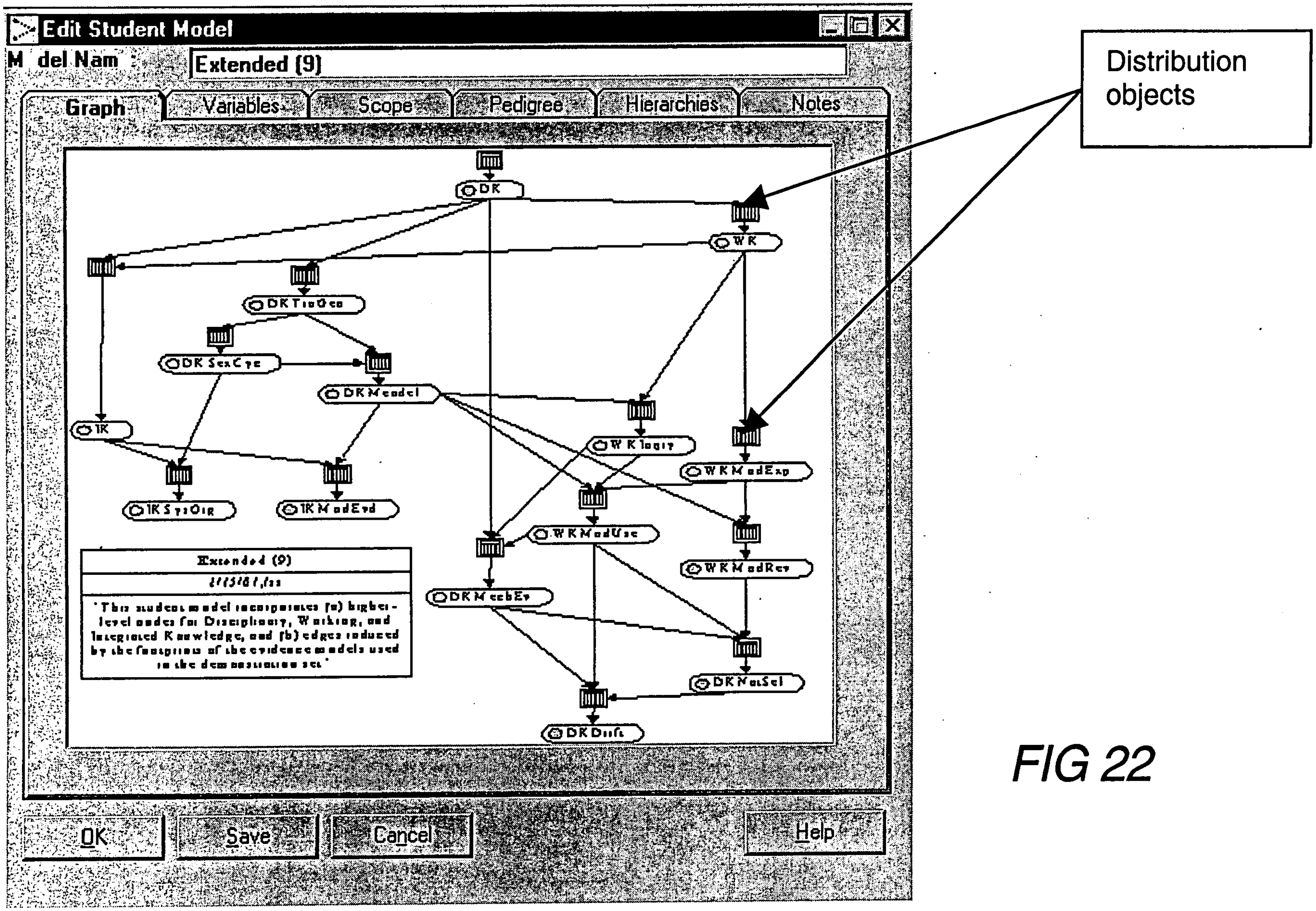
Reporting Name: Sample Statistic

Interpretation: **Score Ranges:** Probablilities at particular levels of proficiency, accompanied by **Score Interpretation Guide.**

Diagrams

AN EXAMPLE REPORTING RULE

FIG 21



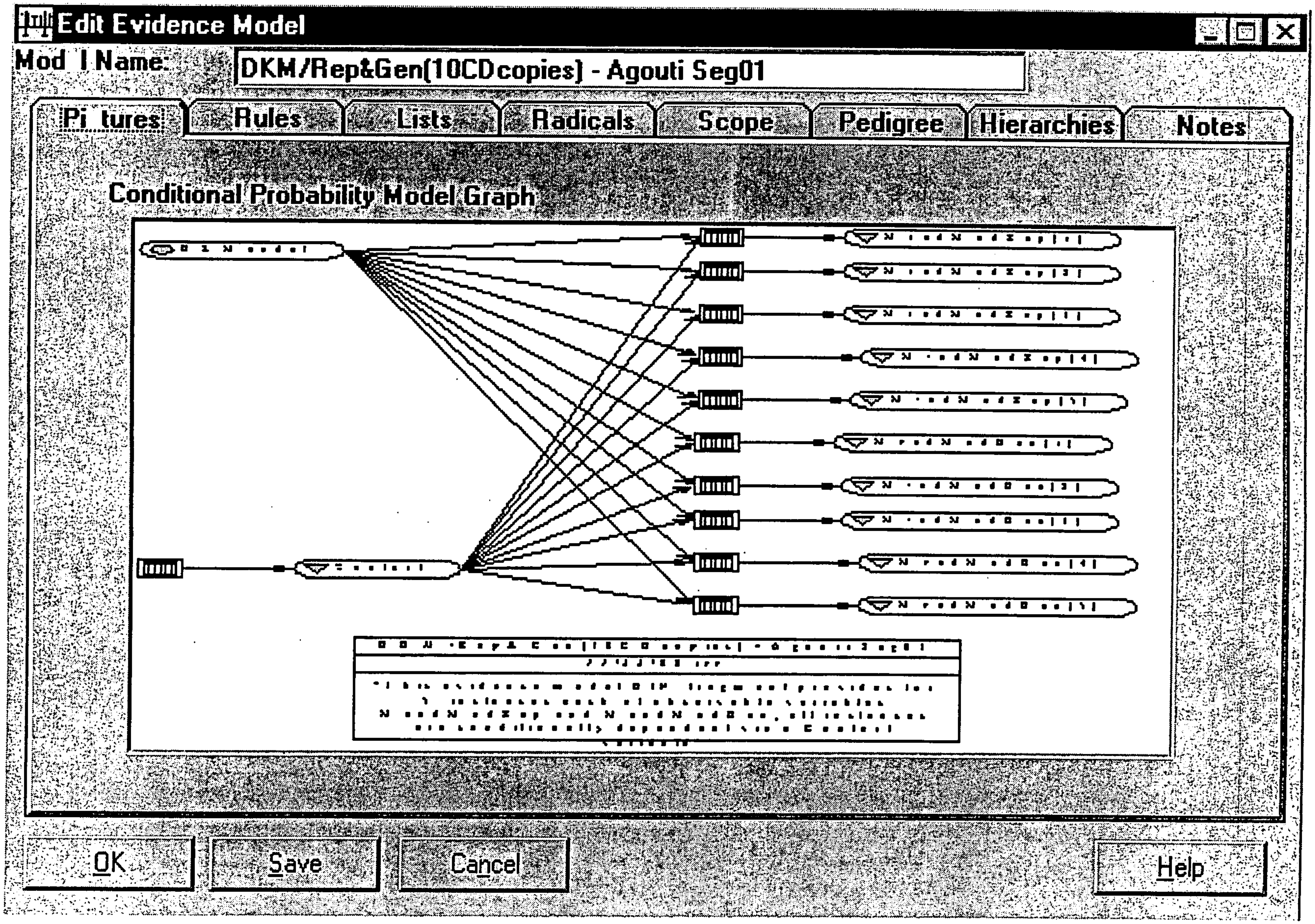
M del Nam : Extended (9)

Extended (9)

[illegible]

"This student model incorporates (a) higher-level nodes for Disciplinary, Working, and Integrated Knowledge, and (b) edges induced by the footprints of the evidence models used in the demonstration set."

FIG 22



Mod l Name: DKM/Rep&Gen(10CDcopies) - Agouti Seg01

FIG 23